DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN-FILE REPORT 85-143
SHEET 2 OF 2

Description of surficial deposits map units

Map unit symbol and title	Description of materials	Distribution and thickness	Topography and drainage	Permafrost	Susceptibility to frost action	Suitability for construction	Special problems
al Flood-plain and low-terrace alluvium	Water-washed and deposited boulder, cobble, and pebble gravel, sand, and silt, with local organic material. Forms lenses and thin to thick beds; local imbricate structure. Large boulders and other material winnowed from glacial and glaciolacustrine deposits through which canyons have been cut; bedrock slabs and boulders added to stream deposits by lateral erosion of canyon walls; locally shale boulders disintergrate rapidly to form silty angular pebbly matrix for gravel. In general, however, sandy matrix contains less than 6% silt sized material. deposits generally coarser upstream, near glacier sources.	Distributed in floodplain and low terraces of major stream systems, including broad outwash plains in front of glaciers and modern fan deltas fronting in lakes such as Tazlina Lake. Thickness of alluvium under downcutting streams in canyons probably less than 23 ft (7 m), as modern paleo stream scour. Thickness may be greater in outwash plain and in fan-delta environment where fluvial topset beds lie above sandy foreset and silty bottomset beds.	Form narrow to broad incised floodplain and low-terrace surfaces as high as 15 to 20 ft (5 - 6 m) above the river, principally along Nelchina, Little Nelchina, Tazlina, and uppermost forks of Matanuska River, and Tyone Creek. Incised valleys bordered by low to high colluvial slopes and sheer bedrock bluffs. Alluvial surfaces well drained, but subject to river flooding at a recurrence interval ranging from about 1 in 2 years on lowest surface to a much greater interval on terraces; floods along Tazlina Lake and River from Nelchina and Tazlina Glacier discharge are much as 5 ft (2 m) above normal lake level and perhaps triple normal streamflow at irregular intervals.	Permafrost may be present locally in silty overburden of terraces, but generally appears absent in coarse-grained fluvial deposits that are warmed by heat condition from bodies of surface water and by convection from moving ground water discharging to the stream. No subsurface data available.	Generally not frost-susceptible except for silt beds and lenses that increase silt content of alluvium to more than 6% and for isolated occurrences where disintegrating shale clasts increase the silt content.	Except for flood hazard due to spring runoff and summer glacier discharge, gravel of floodplain provides level ground and good near-surface materials; however, borings should be drilled to check presence or absence of liquefiable saturated sand and silt and permafrost conditions. Low terraces are less subject to flood and also suitable for construction; local source of saw-quality timber.	Glacial streams and Tazlina Lake subject to sudden (overnight) rise in stage if as much as 5 ft (2 m) due to hot-weather glacier discharge and dumping of ice-dammed lakes. Gravel may contain coal and chert; in some areas it contains shale clasts that cause failure of suitability tests for concrete aggregate.
at Terrace, deltaic, and outwash deposits	Water-worked and deposited boulder, cobble and pebble gravel, sand, and silt, with local organic material. Forms lenses and thin to thick beds; local imbricate structure. Large boulders and other material winnowed from glacial and glaciolacustrine deposits through which the streams cut to deposit alluvium, Generally less than 6% silt, except for local silt lenses and beds; contains local concentrations of oversize material; generally becomes finer downstream in former fluvial and outwash terraces; becomes finer at depth in former deltaic deposits.	Forms terraces along stream courses generally above flood level; covered by silty organic soils that support mature spruce forest with heavy moss cover. Deposits generally as thick as maximum depth of scour - 23 ft (7 m) on major streams; deposits on former deltas may be 10 ft. (3 m) thick and lie above sandy foreset beds and silty bottomset beds. Former outwash deposits of braided channels apparently only 10-15 ft (3-4.5 m) thick at most and lie on till.	Terraces bordering modern streams generally more than 15 ft (5 m) high, broken by tributary gullies; locally covered by fan or colluvial deposits along bluff at valley margin. Well to poorly drained in thick moss, silt mantle, and dense woods. Abandoned deltas and outwash channel terraces deposits, by contrast, are generally burned over, well drained to droughty, but have a generally higher water table than the terraces bordering streams.	Permafrost probably present in high terraces along modern streams, but sporadic in distribution. Permafrost may be absent to sporadic beneath former outwash channel systems which are seasonal stream courses and discharge areas for ground water, and beneath the well-drained old deltaic deposits. Ground-ice settlement problems unlikely in these granular deposits; no subsurface data available.	Generally not frost-susceptible except for silty beds and lenses that increase silt content of material to more than 6%.	Gravelly material more deeply buried by silty and vegetation overburden than lower terraces, and greater chance for frozen ground, in deposits along river; the higher terraces offer gullied sites having good drainage and materials, access to granular borrow and water. Other sites in former outwash plains and deltas have excellent topography, materials, and water supply.	
b Beach deposits	Rounded to subangular, well sorted, accumulation of pebbles and cobbles as large as 1 inch (3 cm) in diameter, granules, coarse and medium sand. Commonly rests on or grades into wave-winnowed boulder concentrations at base of deposit and top of underlying till; may merge laterally to lag boulders at the base of wave-cut scarp.	Principally found along shoreline about 2,450 ft (747 m) above sea level marking one of the last major lake stands with a semi-stable outlet. Deposit is seldom as wide as 330ft (100 m) across series of beach ridges, and is more commonly a single poorly-developed beach ridge, 6-10 ft (2-3 m) high, and containing, perhaps 6 ft (2 m) of beach material.	Forms single to multiple elongate beach ridges less than 10 ft (3 m) high and individually about 15 ft (5 m) across, though they do occur in groups aggregating 330 ft (100 m) in width. Deposit is well drained and generally entirely above the water table; supports aspen and other forms of dry land vegetation.	Permafrost is not present within the shallow zone occupied by beach deposits, but may occur at greater depth in local areas.	Not susceptible to frost action.	Deposit is really too thin and of too limited areal extent to be considered for major construction sites. However, it is suitable to excellent foundation and drainage for small sites, with modest amounts of clean granular borrow.	Linear deposits of limited thickness useful only for road or airfield alignment or for providing small amounts of borrow.
c Colluvium	Mixed silt, sand, gravel, and broken rock derived by gullying, mudflow activity, creep, and landsliding that mix and redeposit material from bluffs to the base of the bluffs. Generally non stratified to poorly or irregularly stratified; locally mixed with organic material.	Largely concentrated along base of river bluffs and include cones, fans, creep deposits, and landslides too small to map individually. Thickness less than 33 ft (10 m), wedging out to upslope boundary and irregularly thinning downslope to toe of unit, commonly deposited on alluvium.	Localized on lower third of slopes of river bluffs and other breaks in slope, and extend out onto adjacent plains at base of slope. Relief is uneven reflecting landslide, gravity, and mudflow and rill-forming gully action. Unit drains at a steep gradient downslope through gully or rill system; rapid runoff. Soils dry and well drained in some places, wet and plastic in slumps and slides scars where water is discharged.	No information on permafrost, other than speculation that it is probably present, particularly on shaded stabilized north-facing slopes, and to a lesser extent on south-facing slopes.	Locally contains more than 6% silt which when wet is subject to frost action.	Generally not suitable for construction because of steep slopes, poor materials, local seepage sites for ground-water discharge (winter icings), and, particularly because of active slope movement, such as landsliding, soil creep, and gullying.	Unstable slopes require special design or remedial work.
e Eolian deposits	Stratified coarse to fine sand, sandy silt, and silt, organic horizons of peat, shrub, and tree remains.	Localized along tops of bluffs bordering incised rivers - usually the south facing bluff where winds off the Chugach Mountains have blown up over the cliffs to form cliffhead dunes. Deposit generally less than 10 ft (3 m) thick, but may reach as much as 33 ft (10 m) locally.	Forms low, linear ridge along top of bluff. Drainage excellent at summit, but poor on side away from bluff face, where drainage is ponded.	Growth of aspen and dry soils suggest that no permafrost occurs within the eolian deposits, except for the possibility of some minor shallow permafrost on the slopes away from the bluff face.	Probably not susceptible to frost action because of lack of water in soils that are generally sandy, although locally silty.	Fair to poor for construction because of fine-grained foundations and borrow limited on site to sand or silty sand. Risk in location adjacent to steep bluffs, which are locally subject to erosion by river and gullying. Site is dusty as material is blown up over cliff. Terrain broken by ridges and deep gullies.	
f Alluvial-fan deposits	Chiefly angular to subrounded gravel of rock type mapped upslope from upper end of fan; matrix sandy, slightly silty; boulders to granules. Poorly stratified and more poorly sorted than al and at.	Distributed along northern front of Chugach and eastern and southern front of Talkeetna Mountains and along major valleys within these mountains. Thickness unknown, but probably generally less than 33 ft (10 m), 10-15 ft (3-5 m).	In plan, a triangular or fan-shaped map unit, with apex extending up lower third of hillside, and remainder in lowlands. Considerable relief from apex to toe; perhaps 10 - 20 ft (3- 6 m) local relief at stream channels. Gravelly deposits well drained on upper and middle parts of unit, but finer material having very low slope near toe is poorly drained and locally covered by swamp and muskeg.	Permafrost probably discontinuous, and more likely to be prevalent and thickest in toe area where drainage is poor and ground-water circulation lower than other areas of coarser materials and higher ground-water gradient. Ground-ice content not known, but could locally be in excess of void spaces of fine-grained deposits at toe of some fans.	Susceptible to frost action where silt content exceeds 6% and where water is present, especially in the toe of many fans; coarser silt-free gravel not subject to frost action.	Construction limited by steep slopes and shifting stream channels; generally dry, firm foundations with minimum permafrost problems and good sources of borrow are favorable in all except wet toe area of fans where soils are fine grained. Care should be taken to avoid areas of alpine mudflows indicated by levee-bordered stream courses and silty soils.	Shifting stream channels; mudflow and potential avalanche hazard.

Description of bedrock lithology

Upper-and lower-case map symbols listed in column at left edge of table; lower-case map symbols explained in adjoining Description of Surficial Deposits Map Units. Sources of information listed at bottom of each column.

Ground-water resources

Engineering soils

Proximity to active faults

Slope stability problems

Permafrost

Avalanches on talus slopes and floods on fans

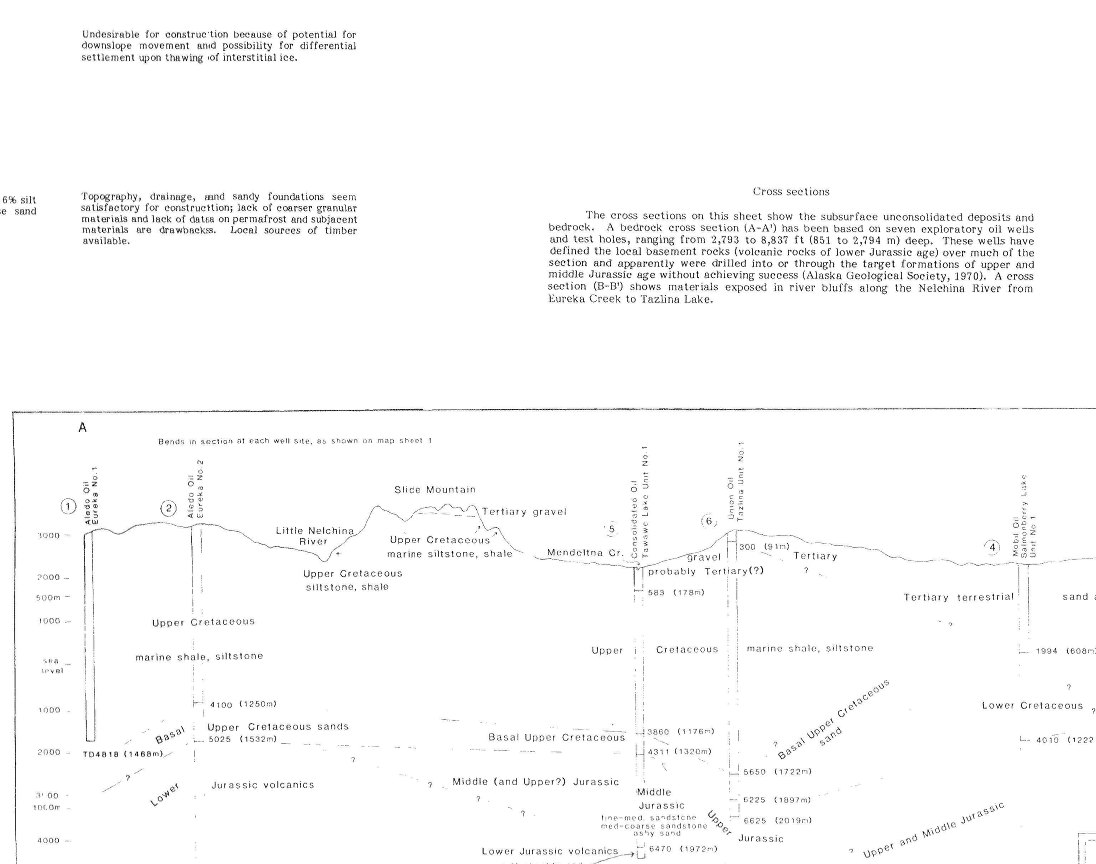
Glaciers and outburst floods

Geologic hazards and special problems

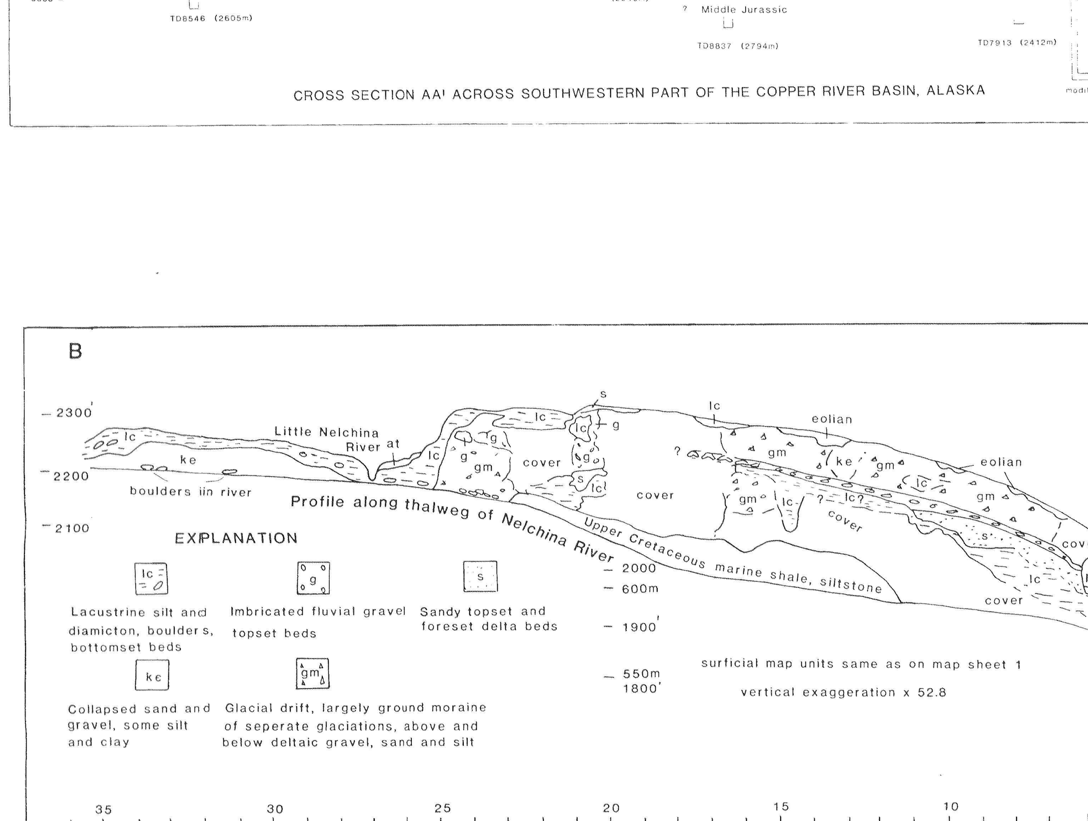
Earthquakes

Cross sections

References cited



CROSS SECTION AA' ACROSS SOUTHWESTERN PART OF THE COPPER RIVER BASIN, ALASKA



CROSS SECTION BB' ALONG NELCHINA RIVER, EUREKA CREEK TO TAZLINA LAKE

ENGINEERING - GEOLOGIC MAP OF THE SOUTHWESTERN COPPER RIVER BASIN AND UPPER MATANUSKA RIVER VALLEY, ALASKA

BY

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1985

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.